THE UNIVERSITY OF MAINE
Maine Business School & Graduate School of Business

MBI
Maine Business Institute

EARNINGS QUALITY TRENDS IN THE STATE OF MAINE: EVIDENCE FROM PUBLICLY TRADED COMPANIES

Authors:
Morgan Bui, Research Assistant
Dr. Henri Akono, Associate Professor of Accounting

MBI Technical Report #1

SEPTEMBER 2023

AACSB ACCREDITED

Maine Business Institute (MBI) Report #1

Earnings Quality Trends in the State of Maine: Evidence from Publicly Traded Companies

By

Morgan Bui
Research Assistant
The University of Maine
Maine Business School
Maine Business Institute
morgan.bui@maine.edu

and

Dr. Henri Akono*
Associate Professor of Accounting
The University of Maine
Maine Business School
Maine Business Institute
henri.akono@maine.edu

*Corresponding author at: 5723 Donald P. Corbett Hall Room 313, Orono, ME 04469-5723. Telephone: 1-207-404-1790; Fax: 207-581-1956. E-Mail: henri.akono@maine.edu

Earnings Quality Trends in the State of Maine:
Evidence from Publicly Traded Companies

Contents

Earnings Quality Trends in the State of Maine:
Evidence from Publicly Traded Companies

Abstract

This study analyzes trends in earnings quality for a sample of publicly traded Maine firms over the period 2010-2021. Our examination focuses on the cash flow perspective of earnings quality, i.e., whether reported earnings numbers are supported by stronger operating cash flows. Our findings show that earnings quality has been steadily increasing during the sample period, except for a decline between 2015 and 2017, and more recently during the period 2019 – 2021. This suggests that the reported earnings of Maine firms in our sample are supported by strong operating cash flows, but potential relaxation in trade and/or collection policies during the COVID-19 period, may have led to lower earnings quality. A forecast analysis conducted using data from the sample suggests that the trend in earnings quality will be increasing back in the years 2022 and 2023. To the extent the large publicly traded Maine firms in our sample are representative of the Maine economy, our findings suggest good news for the State economy in the near future.

Keywords: Earnings Quality; Cash flow perspective; State of Maine

1. Introduction and background

This study examines trends in earnings quality for a sample of publicly traded companies in the State of Maine. Earnings (i.e., net income) is one of the most important performance measures of profitability typically released by companies through their financial statements. This metric is useful to external stakeholders, including investors who want to decide whether to put their money in a firm, creditors who want to ensure that an organization can repay its loans, and various other stakeholders, including state and local governments. Publicly traded companies are required to follow generally accepted accounting principles (GAAP) when they compute earnings, and thus, Earnings for such companies comprises two components, notably accruals and cash flows. Because GAAP allows management some discretion in making accounting choices, reported earnings numbers do not always reflect a company's current performance and are not always useful for predicting future firm performance. This issue has led external stakeholders to consider earnings quality as a basis for decision-making, for instance in the context of investment, business acquisitions, or loans decisions, just to state a few.

Currently in the State of Maine, there is availability of information about various overall macroeconomic aggregate indicators. For instance, for the period 2017-2022, the State of Maine ranked 12th in growth with a Gross State Product growth rate of 2.0%; 3rd in business growth rate with a rate of 4.1%, and 27th in unemployment rate.[1] During the same period, the top three sectors by total employment are Real Estate and Rental and Leasing, Healthcare and Social Assistance, and Manufacturing; whereas the top three highest employment sectors in Maine are the Healthcare and Social Assistance, Retail Trade and Educational Services. Furthermore, the top 3 largest industries by revenue for this period are Life Insurance and Annuities, Hospitals, and Gas Stations with Convenience Stores. These trends in macroeconomic indicators provide information about which business sector is growing and contributing more to the overall state's economy. However, there is limited accounting-related information at the state level, even though trends in earnings quality can be indicative of future business growth or potential economic difficulties for the State, and thus could complement aggregate economic indicators.

Our study focuses on publicly traded companies because these firms have a significant impact on the overall statewide economic growth, employment levels, and well-being through charitable activities.[2] Using data for the period 2010-2021, we find that the trend in median earnings quality for our sample increased from 2010 to 2015, then declined from 2015 to 2017, then increased again from 2017 through 2019, and has been declining for the remainder of the sample period, i.e., until 2021. Because we are focusing on the cash flow dimension of earnings quality (see details in section 2), lower earnings quality means that reported earnings are not supported by cash flows. Thus, our findings suggest that for publicly traded Maine firms, reported earnings were not supported by strong cash flows during the period 2019 through 2021. This could be due to potential relaxation in trade and/or collection policies associated with the Covid-19 pandemic.

[1] Maine – State Economic Profile (2023) - https://www.ibisworld.com/united-states/economic-profiles/maine/#:~:text=Major%20sectors%20by%20employment%20in,62%2C268%20people%20in%202022%2C%20respectively.

[2] IDEXX (2021) - https://www.idexx.com/en/about-idexx/news/idexx-deepens-connections/

Since a decline in the cash-based earnings quality metric is often associated with a higher likelihood that future earnings will decrease, our findings suggest that unless this trend is reverse, future income for publicly traded Maine firms will potentially be lower.[3] We did compute a forecast for the next two years and results suggest that earnings quality will rise back up in 2022 and 2023, with a 95% confidence level, which is good news for the overall state Economy.

The next section of the report is organized as follows: section 2 discusses the computation of the earnings quality metric, section 3 presents the sample, section 4 reports the results, and section 5 concludes.

2. Computation of earnings quality metrics

2.1. Common perspectives of earnings quality

Earnings quality is commonly viewed as the ability of reported earnings to fairly portray current economic performance and to predict a company's future performance.[4] It can be examined from several perspectives including the persistence perspective and the cash flow perspective.[5] With respect to the persistence perspective, earnings quality reflects the extent to which reported earnings are due to recurring versus nonrecurring transactions or items. A nonrecurring item is defined as a revenue entry that is unlikely to happen again. An example is a company that was able to boost its earnings significantly by selling some disposable assets such as old trucks.[6]

The focus of the cash flow perspective is to determine the extent to which reported earnings are supported by operating cash flows, following from the notion that "cash is king". Sometimes, because of time differences between revenue/expense recognition and cash receipts/payments, earnings numbers might be higher, while cash collections/disbursements are delayed. To those who believe cash generation plays a key role in the survival of the firm, the cash-flow perspective of earnings quality is important, and this is the viewpoint we adopt in this study.

2.2. Measuring and interpreting the cash-flow based proxy for earnings quality

To measure earnings quality under the cash flow viewpoint, we follow prior studies (e.g., Milford and Mathis 2018) and compute the following ratio at the firm level for publicly trade companies that operate in the State of Maine:

$$EQ\_OCF_{it} = \frac{Operating\ Cash\ Flow_{it} - Net\ Income_{it}}{Total\ Revenues_{it}} \quad (1)$$

where:

[3] For emphasis, we cannot and do not know for sure whether future earnings will decline, but there is such a possibility (see also Mulford and Mathis 2018, page 3. Para. 2).
[4] https://en.wikipedia.org/wiki/Earnings_quality
[5] See also Mulford and Mathis (2018)
[6] Furhmann (2021) in Investopedia - https://www.investopedia.com/articles/investing/042413/financial-statement-extraordinary-vs-nonrecurring-items.asp#:~:text=A%20nonrecurring%20item%20refers%20to%20an%20entry%20that%20appears%20on,to%20be%20infrequent%20or%20unusual.

EQ_OCF_{it} = earnings quality from the cash-flow generation perspective for firm *i* at time *t*;[7]
$Operating\ Cash\ Flow_{it}$ = cash flows from operating activities for firm *i* at time *t*;
$Net\ Income_{it}$ = net income for firm *i* at time *t*;
$Total\ revenues_{it}$ = total revenues for firm *i* at time *t*;

Next, we compute the median (mean) of individual yearly firm values of EQ_OCF_{it} to derive a state-based proxy for earnings quality. An increasing trend in the earnings quality ratio suggests that the reported earnings of the companies that operate in Maine are supported by stronger operating cash flow. In contrast, a decreasing trend in the earnings quality ratio indicates that the reported earnings of Maine companies are not supported by strong operating cash flows, which raises the potential for declines in future performance.

An implicit assumption in our earlier discussion about the *EQ_OCF* metric is that an increase in this metric is mostly driven by its cash component, rather than its accruals component. However, since earnings includes both accruals and cash flows, it is not always the case that an increase in earnings quality was driven by strong cash flows. Let's look at a numerical using the following scenario:

- Year 1: Let's assume that Operating Cash Flows = 40; Revenues = 100; and Net income = 10. In this case, *EQ_OCF* = (40 – 10)/100 = 30%.

- Year 2: Let's assume that Operating Cash Flows = 30; Revenues = 100; and Net income = -5. In this case, *EQ_OCF* = [30 – (-5)]/100 = 35%.

Obviously, *EQ_OCF* has increased from year 1 to year 2, but the cash component has decreased from 40 to 30.

Therefore, to examine whether trends in earnings quality are driven mostly by changes in operating cash flows or accruals, we decompose the *EQ_OCF* metric shown in equation (1) into two components, namely operating cash margin (*CASH_MARGIN*) and accruals margin (*NI_MARGIN*), as follows:

$$CASH\_MARGIN_{it} = \frac{Operating\ Cash\ Flow_{it}}{Total\ Revenues_{it}} \quad (2)$$

$$NI\_MARGIN_{it} = \frac{Net\ Income_{it}}{Total\ Revenues_{it}} \quad (3)$$

In this context, an increasing trend in the earnings quality ratio that's driven by an increasing trend in the *CASH_MARGIN* is indicative of stronger cash generating ability by Maine firms and suggests better economic prospects. In contrast, a declining trend in earnings quality associated with a declining trend in the *CASH_MARGIN* suggest that the reported earnings of Maine firms are not supported by strong operating cash flows, which raises the concern that future performance will decline.

[7] We do not make any adjustments for nonrecurring or nonoperating items in our computations.

3. Sample selection and descriptive statistics

3.1. Sample selection and distribution

Table 1 reports the sample selection process and the sample distribution. The data from this study is obtained from the Wharton Research Data Services (WRDS), Compustat. Firms are included in the sample if their state code is "ME" to indicate the state of Maine. We exclude companies that operate in the financial industry (SIC 6000 – 6099).[8] We also eliminate firm-years with missing observations required to compute variables of interest in the study.[9] The final sample includes 7 publicly traded firms and 62 firm-year observations, for the period 2010-2021 and the list of firms is provided in the appendix. The sample selection process is summarized in Panel A of **Table 1**. Panel B reports the distribution of the sample firms by year. The firm-year observations appear evenly distributed across all years, with an average of 5 firm-year observations per year.

Table 1: Sample distribution and descriptive statistics

Panel A: This table reports the sample description for the Maine firms.

Initial Maine Sample from Compustat (2010 – 2021)		154
Less, financial firms	89	
Less, missing observations for variables of interest	3	
Final sample		62

Panel B: Sample distribution by year.

Year	**Number of firm-year observations**
2010	5
2011	5
2012	4
2013	4
2014	5
2015	5
2016	6
2017	6
2018	6
2019	6
2020	5
2021	5

[8] Financial firms removed include Asa Gold and Precious Metals; Northeast Bank; Bar Harbor Bankshares Corp; Camden National Corp; First Bancorp Inc/Me; Katahdin Bankshares Corp; and Auburn Bancorp Inc.

[9] The 3 missing observations are those of Covetrus Inc. in 2013, 2014, and 2015.

3.2. Descriptive statistics and correlations

Table 2 presents the descriptive statistics and results from correlation analyses for the variables used to compute earnings quality, notably sales revenues, operating cash flows, and earnings. Panel A suggests that during the sample period 2010-2021, the average publicly traded Maine firm is profitable, with positive operating cash flows. Panel B shows that operating cash and net income are positively correlated, and the coefficient is large as one would expect.

Table 2: Descriptive statistics and Correlation analysis

Panel A: Descriptive statistics income statement variables required to compute earnings quality.

Variables	**Mean**	**Median**	**Stdev**	**Q1**	**Q3**
Revenues (REVT)	1,107.94	819.39	1,201.58	33.82	1,559.87
Operating cash flows (OANCF)	179.04	141.67	202.61	1.31	274.48
Net income (NI)	86.47	97.96	204.54	-0.17	157.87

Panel B: Correlation matrix Pearson on the bottom left and Spearman on the top right.

	Revenues (REVT)	*Operating cash flows (OANCF)*	*Net income (NI)*
Revenues (REVT)		0.673***	0.470***
Operating cash flows (OANCF)	0.402***		0.696***
Net income (NI)	0.049	0.439***	

*** denotes statistical significance at the 1% level.
All variables are defined in the appendix.

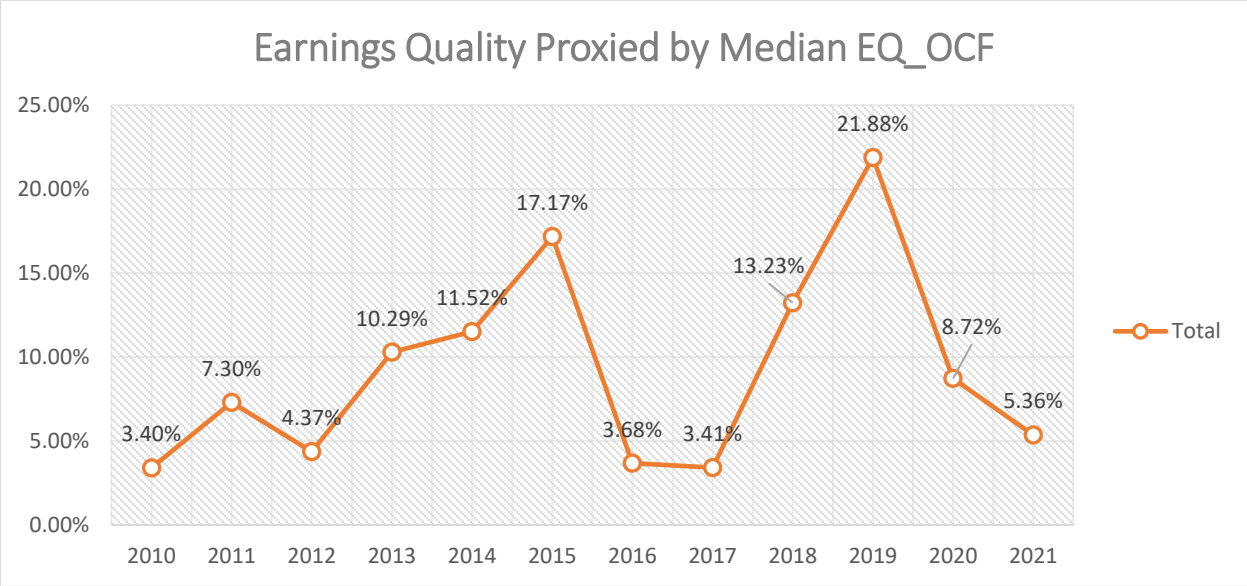
4. Trend analysis results

4.1. Earnings quality trends

Figure 1 reports the results of trend analysis for all sample firms by year for the period 2010-2021. The chart shows that earnings quality increased steadily from 2010 to 2015, from 3.4% all the way to 17.2%; then fell sharply to 3.7% in 2016 and 3.4% in 2017; and next, rose back up to 13.2% in 2018 all the way to a peak of 21.9% in 2019. Since the year 2019, earnings quality has been trending downward to a low of 5.4% in 2021.

Because we are focusing on the cash flow perspective of earnings quality, the recent downward trend in earnings quality raises the concern that future earnings performance for the publicly traded firms in our sample will be lower. To be more detailed, a declining trend in earnings quality suggests that firms could be having difficulty collecting receivables, or maybe had to relax sales policy by offering more credit options to customers. In other words, the downward trend suggests that unless reverse, future earnings performance will decline for the sample firms, which will negatively impact Maine overall economic.

Figure 1: Earnings Quality trend for the State of Maine (2010 – 2021)



Overall, earnings quality in Maine has been mostly positive since 2010, with a few years of decline. However, the low of 5.4% in 2021 is still higher than the bottom numbers of 3.40% in 2017. Since, the cash flow-based earnings quality metric can increase of decrease due to changes in cash margins or net income margins, further analyses are conducted.

4.2. Cash margin and earnings quality trends

Figure 2 shows the trends in earnings quality along with the trends in cash margin for our sample of firms for the period 2010-2021. The graph of the cash margin (in orange) mirrors the graph of the earnings quality metric (in blue), closely for most years. Specifically, cash margin increased from 16.2% in 2010 to a peak of 28.4% in 2015, then declined to 10.2% in 2016, picked back up to 23.9% in 2020 and declined to 8.1% in 2021. Furthermore, there seems to be a one-year time lag between the earnings quality and cash margin trends, which would be consistent with cash collections and/or disbursements following accrual transactions such as trades receivables or payables.

Interestingly, during the period 2018 and 2019, there was an inversion between the earnings quality and cash margin graphs. Throughout the sample period, the cash margin graph is usually on top of the earnings quality graph, but in 2018 and 2019, the earnings quality graph is above the cash margin graph. This reversal is even more interesting if one also looks at the seasonally adjusted unemployment rate graph for the State of Maine shown on **Figure 3** below. While this study makes no claim of causality and does not conduct any formal hypothesis test about a relationship between earnings quality and unemployment rate, it is worth noting that a higher unemployment rate in the State of Maine in 2020 and 2021 followed this reversal by a one-year lag.

Figure 2: Trends in Earnings Quality and Cash Margin for Maine firms (2010 – 2021)

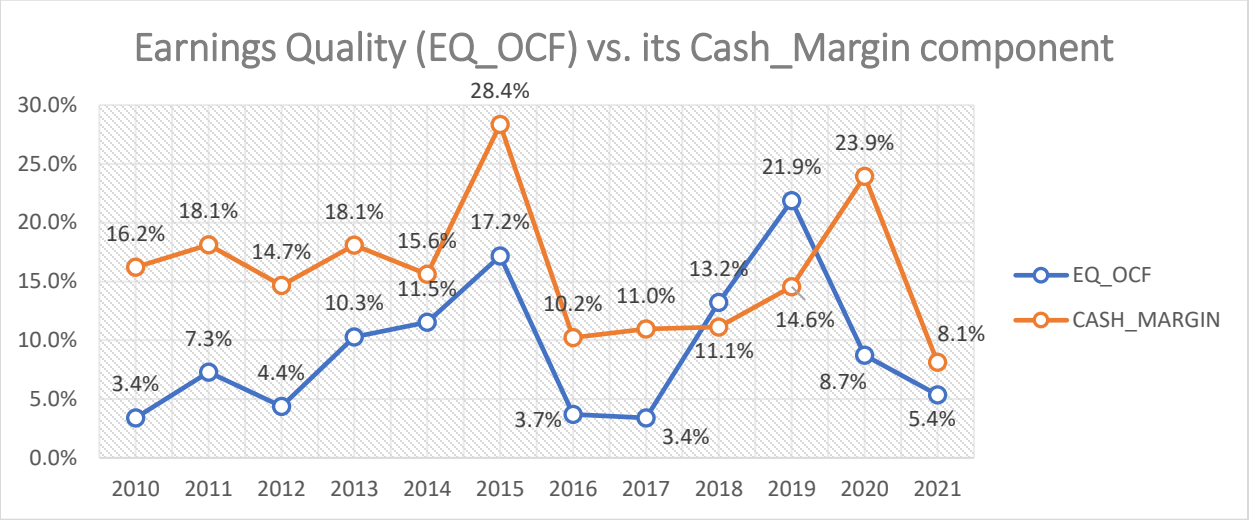
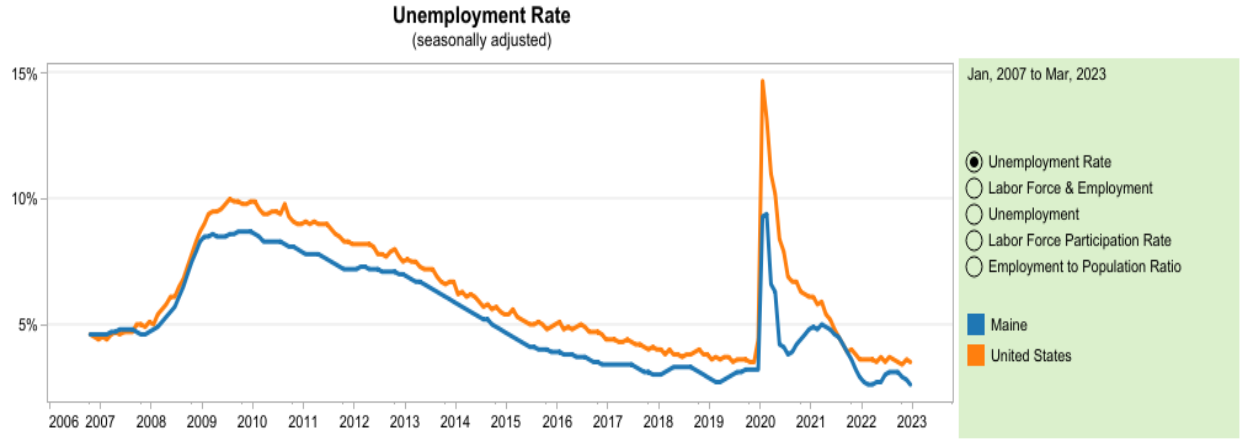


Figure 3: Unemployment rate (seaonally adjusted) trend for State of Maine (2006 – 2023).

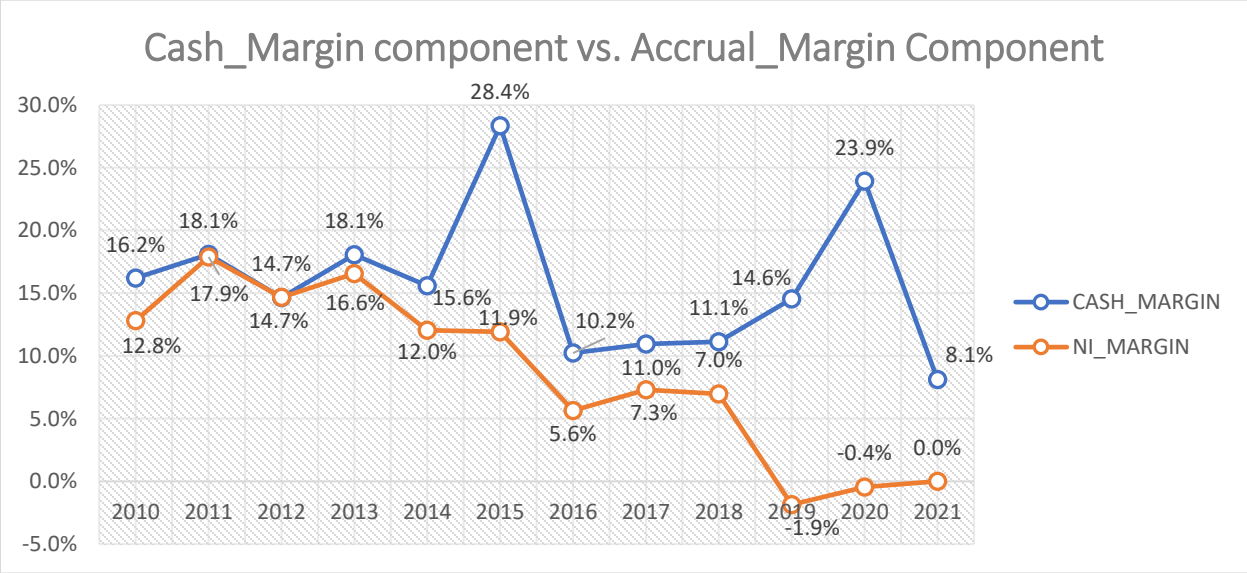


Source: https://www.maine.gov/labor/cwri/laus.html

4.3. Cash margin and accruals margin trends

To examine earnings quality trends further, we also computed a graph that shows net income margins over the sample period. As shown on **Figure 4**, the accrual margin (i.e., *NI_MARGIN*) graph has been trending downward until it reached a bottom of -1.9% in 2019, but is climbing back with values of -0.4% in 2020 and 0.01% in 2021. This finding provides further evidence that earnings quality trends (as shown in **Figure 1**) are driven to a greater extent by operating cash flows, i.e., are affected more by the cash generation and collection policies of Maine firms. However, the trend in the accruals component pattern also raises the question of what's been driving the consistent decline in net income margins for the sample of firms in this study.

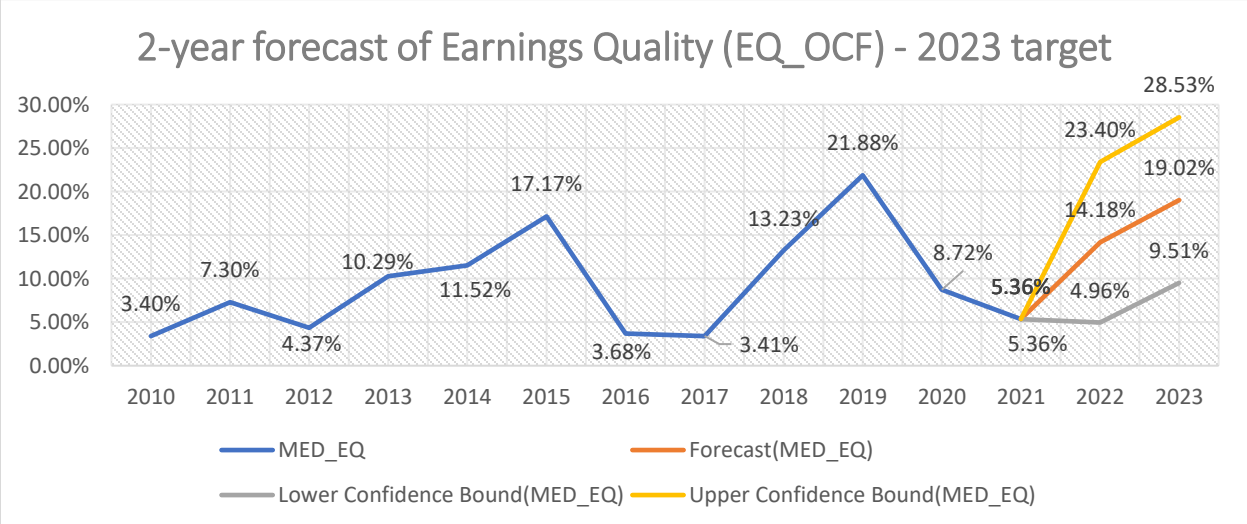
Figure 4: Trends in Cash Margin & Accruals Margin components for Maine firms (2010 – 2021)



4.4. Basic forecast of earnings for next 3 years

Figure 5 shows a forecast of earnings quality (EQ_OCF) for the years 2022 and 2023 (in orange) an upper confidence bound (in yellow), and a lower confidence bound (in gray). The forecast was computed using the Forecast Sheet functionality in Excel. In terms of forecasting options, the timeline range was from 2010-2021, the value range was the data for the EQ_OCF over the period 2010 to 2021, a 95% confidence interval was used, and seasonality was set to be detected automatically. Based on the forecast results, EQ_OCF will climb back to 14.18% in 2022 and 19.02% in 2023, which bodes well for the overall economic wellbeing of the State of Maine. Furthermore, both the lower and upper confidence bound indicate an improvement in EQ_OCF for the next two years, even though based on the lower bound, there might be a slight decline to 4.96% in 2022, before going back up to 9.51% in 2023.

Figure 5: 2022 and 2023 forecasts of earnings quality (EQ_OCF) for Maine firms (2010 – 2021)



5. Conclusion

This study examined the earning quality trend for a sample of publicly traded Maine firms over the period 2010-2021 from the cash-flow perspective. The takeaway is as follows: overall earnings quality has been declining since 2019, and it's driven mostly by the cash margin component. This suggests that future earnings performance is likely to decline for sample firms, unless this trend is reversed. To the extent that our sample for firms has a significant impact on overall Maine economy, the findings further suggest potential decline in Maine economic growth. To examine this possibility of decline, we computed a forecast and based on the time series data, there will most likely be an increase in earnings quality in 2022 and 2023.

References

Furhmann (2021); https://www.investopedia.com/articles/investing/042413/financial-statement-extraordinary-vs-nonrecurring-items.asp#:~:text=A%20nonrecurring%20item%20refers%20to%20an%20entry%20that%20appears%20on,to%20be%20infrequent%20or%20unusual. Retrieved on July 27, 2023.

IDEXX (2021). IDEXX Laboratories Deepens Connections to Maine-Based Community Partners to Drive Greater Home-State Impact. https://www.idexx.com/en/about-idexx/news/idexx-deepens-connections/ Retrieved on July 27, 2023.

Maine.gov. Center for Workforce Research and Information (2023). https://www.maine.gov/labor/cwri/laus.html Retrieved on July 27, 2023.

Maine – State Economic Profile (2023). https://www.ibisworld.com/united-states/economic-profiles/maine/#:~:text=Major%20sectors%20by%20employment%20in,62%2C268%20people%20in%202022%2C%20respectively Retrieved on July 27, 2023.

Mulford and Mathis (2018). Earnings Quality Trends (Quarter 1, 2018). The Scheller College of Business, Georgia Institute of Technology, Atlanta, GA 30308-0520.

Appendix: list of firms included in the sample.

Company Name	Ticker Symbol	City	SIC Code
BANGOR HYDRO-ELECTRIC CO	EMA1.	Bangor	4911
IMMUCELL CORP	ICCC	Portland	2835
IDEXX LABS INC	IDXX	Westbrook	2835
CENTRAL MAINE POWER CO	EAS3	Augusta	4911
WEX INC	WEX	Portland	7374
SYNERGY CHC CORP	SNYR	Westbrook	2834
COVETRUS INC	CVET	Portland	5912

Acknowledgements:

This study was completed with support from the Maine Business School.